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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/718,008	11/21/2000	Kenneth Perlin	KPER-4	9323

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EXAMINER	
WANG, JIN CHENG	
ART UNIT	PAPER NUMBER
2672	4

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/718,008	PERLIN, KENNETH	
	Examiner	Art Unit	
	Jin-Cheng Wang	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The amendments filed on 06/30/2003 have been entered. Claims 1, 6, 11, 12 have been amended.

Specification

1. The disclosure is objected to because of the following informalities: On page 3, line 17, "choose" should be "chosen". On page 16, line 7, "lattic" should be "lattice". Appropriate correction of all mistakes is required.

2. The applicant or their representatives are again urged to review the specification and submit corrections for all mistakes of a grammatical, clerical, or typographical nature.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Andy G. Ye and David M. Lewis "Procedural Texture Mapping on FPGAs", ACM 1999, 1-58113-088-0/99/02, page 112-120 (hereinafter Ye).

5. Claim 1:

Ye teaches a method for creating an appearance of texture in a computer image (see e.g., figures 11-14) comprising the steps of:

Inputting a point {xd} in D-dimensional geometric space R^3 described via D M bit quantities id and D N bit quantities ud, where id are M bit representations of greatest integers not > xd, and ud are N bit representations of remainders (xd – id), where M and N are integers > 3 and D = 3, in a computer (page 116);

Computing a pseudo-random hash value at each vertex of a unit cube C surrounding the point (figure 8);

Computing a contribution from each vertex using the hash-value (figure 6);

Combining with the computer the contribution from each vertex into a single interpolated result (page 115-116).

6. Claim 12:

Ye teaches an apparatus for creating an appearance of texture in a computer image (pages 117-118) comprising:

A computer (pages 117-118);

A mechanism for inputting a point {xd} in D-dimensional geometric space R^3 (a Perlin noise function of three-dimensional space; see page 115) described via D M bit quantities id and

D N bit quantities ud, where id are M bit representations of greatest integers not > xd, and ud are N bit representations of remainders (xd – id), where M and N are integers > 3 and D = 3, in a computer (See Perlin Noise Function of pages 115-116);

A mechanism for computing a pseudo-random hash value (e.g., pseudo-random function values using xor tables) at each vertex of a unit cube C (corners of a grid cell) surrounding the point (See the Random Number Generator of figure 8);

A mechanism for computing a contribution from each vertex using the hash-value (hash values being used for interpolation. See figure 6);

A mechanism for combining with the computer the contribution from each vertex into a single interpolated result (See in particular the linear interpolation unit output of figure 6 and 7; page 115-116).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andy G. Ye and David M. Lewis "Procedural Texture Mapping on FPGAs", ACM 1999, 1-58113-088-0/99/02, page 112-120 (hereinafter Ye).

9. Claims 2-4:

(1) Ye teaches a method of hardware texture mapping in which texture images are synthesized using FPGAs including the computing a hash value step (page 116), the computing a contribution step and the combining step.

(a) Ye teaches computing multiple n-bit pseudo-random hash values, one hash value for each of the eight vertices of the surrounding unit cube C using XOR table.

(b) Ye teaches computing for each vertex of the surrounding unit cube C the contribution of each vertex with XOR modules.

(c) Ye teaches combining the contribution from each vertex into a single result using 3 ease-curve s modules (figures 6, 9 and 10).

(2) Ye does not teach (a) six "+" modules combined with seven "L" modules; (b) three "+" modules combined with eight "H" modules; (c) the s modules.

(3) Ye however teaches (a) the "+" modules (figure 8); (b) the "L" modules and the "H" modules (figures 7 and 8); (c) the s modules (figures 6 and 10).

(4) It would have been obvious to one of ordinary skill in the art to have incorporated the various combinations of "+" modules, the "L" modules, "H" modules and the s modules into the Ye's method for hardware texture mapping because Ye suggests implementing "+" modules in figure 8, XOR modules in figure 8 and s modules in figures 6 and 10 and therefore suggesting an obvious modification.

(5) Therefore, it would have been obvious to implement Ye's method with some specific numbers/combinations of modules in different layout so that it would facilitate an efficient implementation of Perlin Noise based 3-D procedural textures.

Claim 5:

The claim 5 encompasses the same scope of invention as that of claim 4 except additional claimed limitation of a look-up table. However, Ye further discloses the claimed limitation of a look-up table (page 116).

Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 5 except additional claimed limitation of computing a gradient direction from each hash value. However, Ye further discloses the claimed limitation of computing a gradient direction from each hash value (page 116).

Claim 7:

The claim 7 encompasses the same scope of invention as that of claim 6 except additional claimed limitation of allowing the inner product to be done using no multiples, only adds and shifts. However, Ye further discloses the claimed limitation of allowing the inner product to be done using no multiples, only adds and shifts (figures 6-10).

Claim 8:

The claim 8 encompasses the same scope of invention as that of claim 7 except additional claimed limitation of choosing the gradients. However, Ye further discloses the claimed limitation of choosing the gradients (page 116).

Claim 9:

The claim 9 encompasses the same scope of invention as that of claim 8 except additional claimed limitation of using 7 linear-interrelation modules L to perform a trilinear interpolation.

However, Ye further discloses the claimed limitation of using 7 linear-interrelation modules L to perform a trilinear interpolation (pages 115-116).

Claim 10:

The claim 10 encompasses the same scope of invention as that of claim 9 except additional claimed limitation of computing an ease curve. However, Ye further discloses the claimed limitation of computing an ease curve (page 116).

Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of linear interpolations modules. However, Ye further discloses the claimed limitation of linear interpolations modules (figure 7).

Remarks

10. Applicant's arguments, filed 06/30/2003, paper number 3, have been fully considered but they are not deemed to be persuasive.

11. Applicant argues in essence with respect to claim 1 and other related claims that:

a) "The Examiner has rejected Claims 1 and 12 as being anticipated by Ye and Lewis. Applicant respectfully traverses this rejection in view of the amendments to the claims. Claims 1 and 12 now have the limitation with the geometric space is R^3. ...Ye and Lewis teach that a system based on the prior art Perlin noise function which the claimed invention improves upon is not based on a point in R^3 space. Accordingly, Claims 1 and 12 are patentable over Ye and Lewis."

This is not found persuasive because Ye and Lewis teaches a gate-level implementation of improved versions of Perlin Noise Function of three-dimensional space. According to Ye and Lewis, it is apparent that the original method in the prior art Perlin noise function that applicant refers to can consume quite large amounts of memory since multiple copies of the pseudo random function are needed to fully exploit the parallelism available. Unfortunately, both the claim limitation as set forth in the present claims and applicant's argument have not identified a difference between the claim invention and the prior art Perlin noise function. The claimed invention recites an implementation similar to the texture mapping comprising the three-pipelined stages of hashing, gradient and interpolation as taught by Ye and Lewis. Therefore, the examiner asserts that Ye and Lewis meets the claim limitation as recited in claims 1 and 12. Although these claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Specifically, Applicant has not identified the claim invention to be distinguishable from the prior art of record. From the cited reference, it is concluded that Ye and Lewis fulfills the claims 1 and 12 as currently drafted.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213. The examiner can normally be reached on 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6606 for regular communications and (703) 308-6606 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 395-3900.

jcw
September 4, 2003

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600